

Appln. No.
Reply to Office Action of 10/28/04

REMARKS

Claims 1-13 were presented for examination on 7/30/2003. The Office Action mailed 10/28/2004 indicates that:

(a) Claims 1-13 were rejected under 35 USC 112, first paragraph, as failing to comply with the enablement requirement (in Paragraph 1 of the Office Action);

(b) Claims 1-13 were rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention (in Paragraph 2, first instance, of the Office Action);

(c) Claims 1-6 were rejected under 35 USC 102(b) as being anticipated by US Patent No. 5,901,368 ("Wood et al. Patent") (in Paragraph 2, second instance, of the Office Action);

(d) Claim 7 was rejected under 35 USC 103(a) as being unpatentable over the Woods et al. Patent in view of US Patent No. 5,517,539 ("Corpora et al. Patent") (in Paragraph 3 of the Office Action);

(e) Claim 8 was rejected under 35 USC 103(a) as being unpatentable over the Woods et al. Patent in view of US Patent No. 4,472,855 ("Murray et al. Patent") (in Paragraph 5 of the Office Action);

(f) Claim 9 was rejected under 35 USC 103(a) as being unpatentable over the Woods et al. Patent (in Paragraph 5 of the Office Action);

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(g) Claim 10 was rejected under 35 USC 103(a) as being unpatentable over the Woods et al. Patent in view of US Patent No. 5,089,216 ("Schlonski et al. Patent") and US Patent No. 4,470,951 ("Bradbury et al. Patent") (in Paragraph 6 of the Office Action);

(h) Claims 11-13 were rejected under 35 USC 103(a) as being unpatentable over the Woods et al. Patent in view of US Patent No. 4,950,449 ("Petersen et al. Patent")

Claims 1-16 are presented for reconsideration. Claims 1 and 6 have been amended. Claims 2-5 and 7-13 are unchanged. Claims 14-16 are new. It is respectfully submitted that the application as amended satisfies the requirements of the patent statute. Accordingly, reconsideration of this application in view of the above amendments and the following remarks is requested.

Re: Rejection under 35 USC 112, first paragraph

Claim 1 (along with its dependent Claims 2-13) was rejected for the stated reason that the limitation "after adding at least a portion of the decontamination agent, ..." was not supported by an adequate description or an enabling disclosure.

The Applicants have substituted the limitation "while circulating the reactor coolant containing the decontamination reagent through the RCS" in place of the objectionable limitation. This restated limitation is supported by the specification in the paragraph bridging pages 14 and 15.

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Re: Rejection under 35 USC 112, second paragraph

Claim 1 (along with its dependent Claims 2-13) was rejected for the stated reason that there was insufficient antecedent support for the limitations “the residual dissolved hydrogen” and “the gamma emitting activity”.

The Applicants have canceled the article “the” to improve the definiteness of Claim 1.

Re: Amendment of Claim 6

The Applicants have amended Claim 6 to eliminate a redundancy and to better distinguish Claim 1 and to point out that the cobalt is removed along with the iron.

This is supported in the specification by the last two paragraphs on page 12.

Re: Rejections under 35 USC 102 and 103

Preliminarily, the Applicants note that their improvement as defined by Claim 1 (and its dependent claims) is a highly effective, full system (i.e., entire reactor coolant system including fuel in the core of the reactor pressure vessel) shutdown method that may be performed faster than state of the art methods. This is shown by the data of Table 2 on page 16 of the specification, which indicates that the Applicants’ method can be expected to complete all of the steps of Claim 1 within 24 hours of interrupting power production (to initiate the shutdown) as compared with 40 hours for a state of the art process and 104 hours for a fuel-in multi-step decontamination that was performed a few years ago. Their method satisfies the nuclear industry’s desire to shorten the time of normal fuel outages and to effectively decontaminate their nuclear plants.

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Claim 1 recites the step of degassing the hydrogen from the reactor coolant to remove hydrogen gas while circulating the reactor coolant containing the decontamination reagent to dissolve and complex the iron and nickel. This step (which is intended as a safeguard against the creation of flammable or explosive gas spaces when the reactor coolant system later is opened to the atmosphere) saves time. The Wood et al. Patent cited in the Office Action teaches the art to degas the reactor coolant after circulating the reactor coolant containing the decontamination reagent for the purpose of destroying the decontamination reagent. Thus, the Wood et al. Patent states at Column 7, lines 52-57:

“... Finally, the decontamination system can be used without dis-entraining dissolved gases in order to achieve dynamic equilibrium.

To remove the decontamination chemicals, gas dis-entrainment should take place.”

Claims 2-15 more specifically define the features of the method of Claim 1. Accordingly, it is respectfully submitted that Claim 1 and its dependent Claims 2-15 are not anticipated or rendered obvious by the Wood et al. Patent either alone or in combination with the prior art.

The Applicants particularly note that Claim 7 recites the additional step of delithiating the reactor coolant while removing complexed iron and nickel. As is discussed in the specification at page 11, lines 5-17, in the Applicants method the lithium is permitted to remain in the reactor coolant at its initial levels during the initial steps to offset the quantity of sodium hydroxide needed for pH adjustment of the decontamination reagents and then is removed with the corrosion products, with an attendant saving of waste resin and time. (Thus, the Applicants' rely on temperature reduction of the reactor coolant and boric acid addition to acidify the reactor coolant

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before adding the decontamination reagents.) In addition, this method reduces the risks of removing the lithium too fast.

The Office Action states the position that the Corpora et al. Patent teaches that lithium tends to require additional amounts of decontamination reagents. Indeed, in prior art decontamination practices the reactor coolant was delithiated as soon as possible after interrupting power production in order to lower the pH of the reactor coolant into the acid range as promptly as possible so that the iron and nickel in the oxides then could be reduced and complexed by a chelant. Thus, the practice described in the specification at page 9, lines 11-18 and lines 29-32, began delithiation several hours before the power production was interrupted. Accordingly, it is respectfully submitted that the Corpora et al. Patent teaches the art to delithiate the reactor coolant as soon as possible rather than delaying delithiation until the decontamination reagents were dissolving and complexing the iron and the nickel.

Accordingly, it is respectfully submitted that it would not be obvious based upon the teachings of the Wood et al. Patent and the Corpora et al. Patent to delithiate the reactor coolant while removing complexed iron and nickel.

The Applicants also note that originally presented Claims 11-13 and new Claims 14 and 15 are directed at a chemical shutdown method that includes zinc addition steps before restarting the reactor. Original Claim 12 is directed at a method where the zinc is added while adding decontamination reagents to the reactor coolant. Original Claim 13 is directed at a method where the zinc is added while adding oxidants to the reactor coolant.

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New Claim 14 is directed at a method that does not include a chromium oxidation step (such as an AP step) following a decontamination step (such as a LOMI step or a Can-Derem step). Advantageously, this method will leave a chromium rich, corrosion resistant oxide on the surface of the reactor coolant system. However, the oxide will also retain a substantial portion of its original radioactivity. Thus, the specification states at page 13 that the oxide may retain up to 30% to 40% of its initial activity after a single LOMI step or Can-Derem step. The added zinc may substitute for at least some of the radioactive cobalt in the oxide and reduce its activity. This is discussed in the specification at page 13, lines 10-22, and in the paragraph bridging pages 16 and 17. Claim 15 is directed at a method that includes only one LOMI decontamination step. This is discussed in the specification at page 16, line 10-22.

The Office Action states the position that Claims 11-13 are unpatentable over the Woods et al. Patent in view of the Peterson et al. Patent. However, the Peterson et al. Patent is directed to the continuing maintenance of a zinc ion concentration during the operation of a reactor. Thus, the Peterson et al. Patent states at Column 1, lines 45-49, that:

"It has now been discovered that effective inhibition of radioactive cobalt deposition may be achieved by the continuous addition of zinc oxide to the water-bearing vessel of the reactor throughout the operation of the reactor."

The Peterson et al. Patent then goes on to state at Column 2, lines 12-15, that:

"...The zinc oxide addition is done on a continuous basis throughout the operation of the reactor, providing a constant replenishment of zinc ion."

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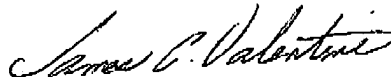
Accordingly, it is respectfully submitted that it would not have been obvious to combine the shutdown method of the Wood et al. Patent with the zinc addition method of the Peterson et al. Patent.

The Applicants have added new Claim 16, which is directed at a preferred shutdown method that includes a LOMI step followed by a zinc addition step without an intervening chromium oxidation step. This is discussed in the specification at page 13, lines 10-22. As is discussed in the specification, the zinc may substitute for the radioactive cobalt that remains in the chromium rich oxide after a single LOMI step.

Thus, it is respectfully submitted that Claims 1-16 are patentable and that the application satisfies the statutory requirements of the statute. Accordingly, allowance of these claims is respectfully solicited.

The Commissioner is authorized to charge any additional fees required by 37 CFR 1.16 or 37 CFR 1.17 as a result of this Reply to Deposit Account No. 50-0947.

Respectfully submitted,



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Date: 1/19/2005

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